Our 12th Year

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AMATEUR TELEVISION MAGAZINE

JULY-AUGUST, 1979

Vol. 9, No. 4

COLORIZE YOUR ROBOT 400.

SATELLITE TV HANDBOOK part II

BUILD: SSTV scope tuning mod.

MRF-901 450 Mhz Preamp. and more

SATELLITE TV SYMPOSIUM. AUG. 19th OKLAHOMA CITY.

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FIELD DAY ATV STYLE!

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Two-meter beams deliver maximum gain and clean patterns, with VSWR of less than 1.2:1 across the entire 144-148 MHz range. High grade insulating materials, weather-resistant aluminum boom and elements. 12, 14 and 16-element beams make outstanding moon-bounce building blocks.

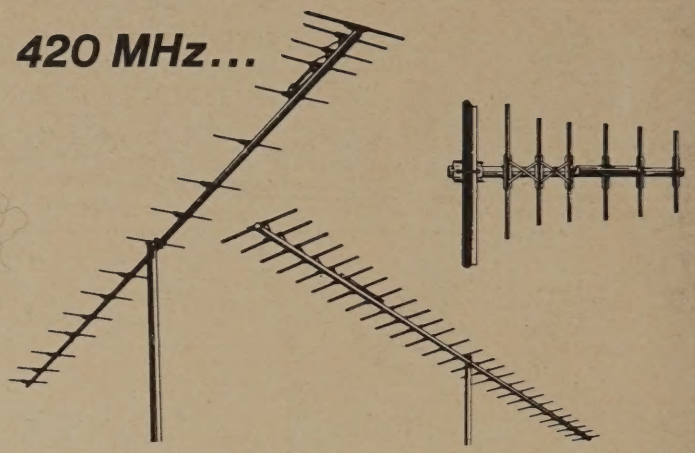
14-Element
KLM-144-148-14 **$65.95**

Gain: 14.2 dBd. Beam width at 3 dM pt.: 18 degrees. Feed impedance: 50 ohms balanced (KLM 1:1 Balun, 144-148-50 optional). Boom dia.: 1½". Boom length: 17.33'. Max. mast size: 1½". Center mounting. Wt.: 8 lbs.

16-Element
KLM-144-148-16 **$72.95**

Gain: 14.8 dBd. Beam width at 3 dB pt.: 16 degrees. Feed Feed impedance: 50 ohm balanced (KLM 1:1 Balun, 144-148-50 optional). Boom dia.: 1½". Boom length: 20.66'. Max. mast size: 1½". Center mounting. Wt.: 10 lbs.

420 MHz...



A versatile series of KLM beam antennas in a variety of configurations: broadband rear-mount type for horizontal or vertical arrangement, ultra-high-gain DX type, and optimized long boom Yagi for narrow-band use. All have VSWR less than 1.2:1 across the entire band. Maximum mast size: 1½".

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KLM-420-470-6 **$19.95**

Frequency: 420-470 MHz. Gain: 8 dBd min. F/B ratio: 20 dB min. Beam width at 3 dB pt.: 30°. Feed impendance: 50 ohm balanced (Balun 420-470-50 optional). Boom dia.: 1". Boom lgth.: 2'. Mounting: End or center; horizontal or vertical. Weight: 1.2 lbs.

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KLM-420-470-14 **$31.95**

End mountable; vertical or horizontal polarization. Excellent for repeater control. Frequency: 420-470 MHz. Gain: 13.7 dBi. Beam width at 3 dB pt.: 24°. F/B ratio: 20 dB min. Feed impedance: 50 ohm balanced. Boom dia.: 1". Boom length: 4.75'. Wt.: 4 lbs.

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(Specify Band)

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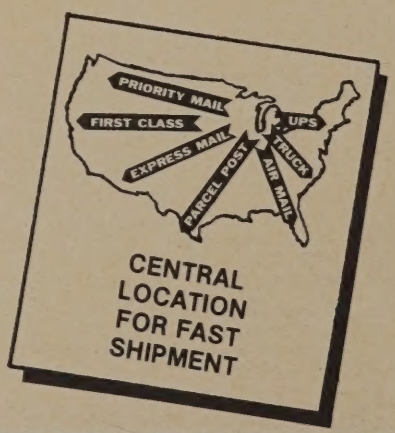

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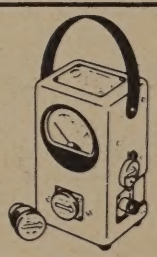

Model 43

$125 + shipping

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DEVOTED TO HAM TV

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Amateur Television Magazine

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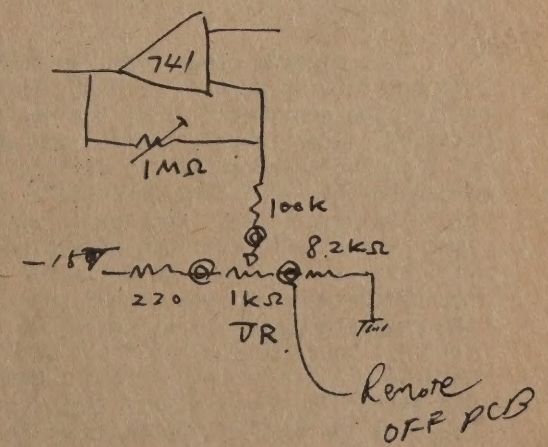
NEWS

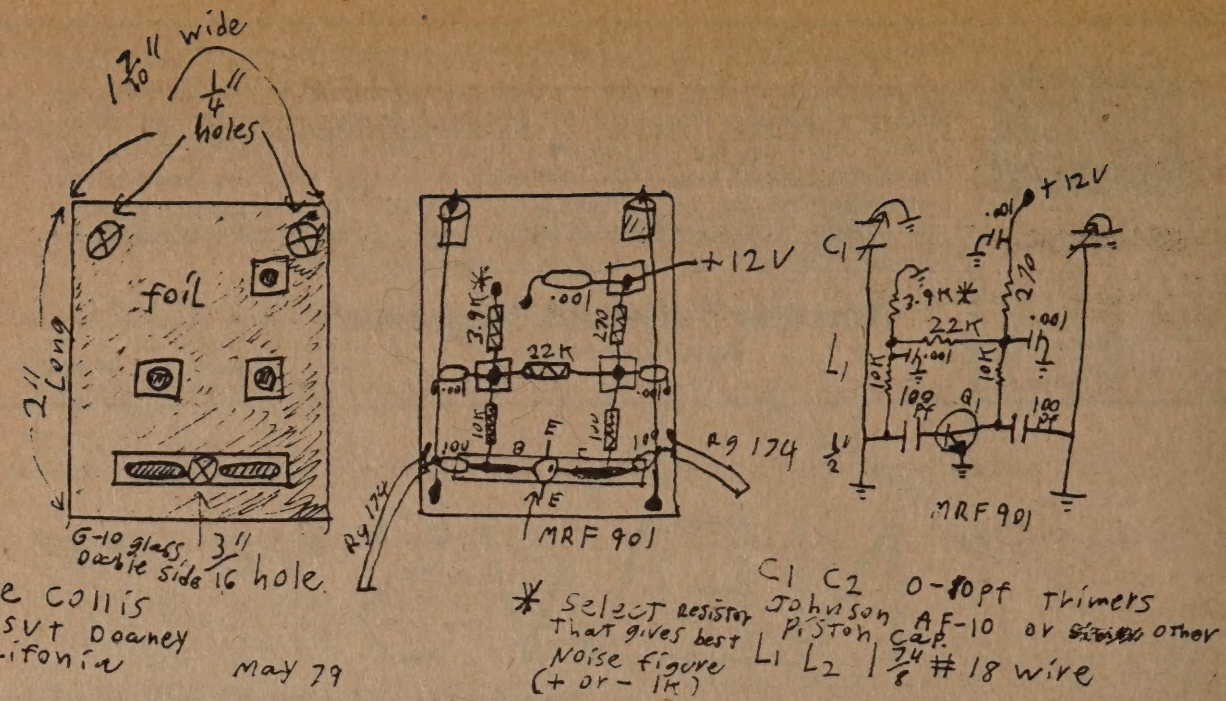
Who were all those people on the cover of the last issue? Counter-clockwise from top, Nick K9BCP Mark, KA9BST, Henry KB9F), Jim W9AKG, Dwight WB9TLH Rex WD9GLJ, Bob K9KTH, Brad WA8WDQ. Some of the 20 plus active stations on WR9AMO, shown in their relative geographical locations. Pix were snapped during a recent QSO.

JAØBZC, Takao visited the US during June and spent several days in Washington DC visiting many area ATV'ers and enjoying the use of WR4AAG. Your scribe happened to be in town at the same time and spent several enjoyable days with Takao and other ATVers. Photo below shows Takao utilizing the ATV RPT courtesy of WA9GVK, Bruce (WB4YTU-ex).

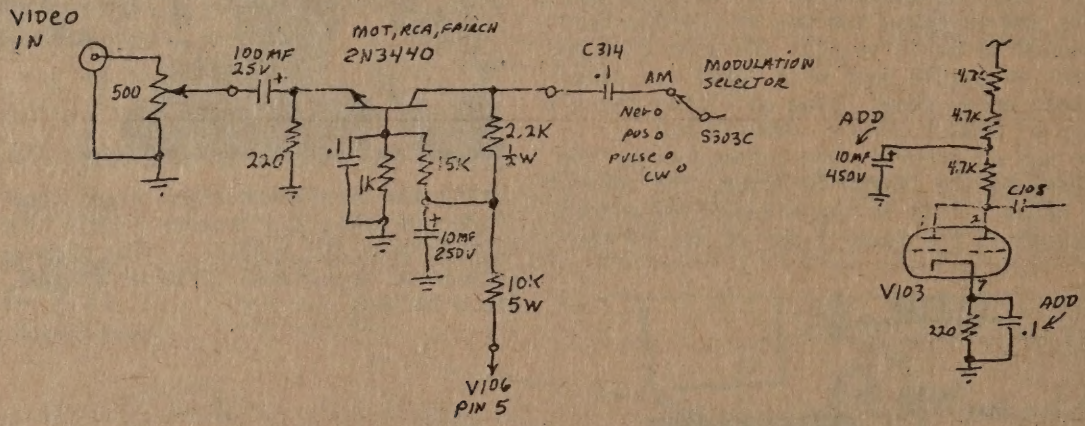
There was an error in the schematic for the SSTV converter of the March 79 issue. The correct diagram is below. This is the video(SSTV) output and was located in the lower right corner of the diagram.

Henry and DC ATV'ers enjoy traditional Japanese dinner as Takao and brother Richie (top right) explain menu and methods. The shamshimi was excellent. No knives, forks or spoons! Photo by Bruce WA9GVK.





This diagram set was sent in by WA6SVT, and uses the MRF-901 transistor for a very hot, low noise preamp for 450 Mhz. The transistor is available for less than $2 from Hamilton Electro Sales in Culver City, CA (213 Zeneth 2-1474. Very good out of band rejection is achieved using the tuned circuits shown. The tuned lines are 1/4" on the foil of the G-10 PCB and are tapped 1/2" off the ground end. Resistors are 1/2 watt, caps are disk. Use double sided PCB. Etch out the squares with the pads in the center for connection points. The MRF-901 mounts in a 3/16" hole in the board.



This diagram comes from Tom W6ORG who says," Real deals can be had for a TS-413 sig gen through surplus or MARS. It covers 400-1000 Mhz and was made for testing radar and other pulse type equipment. As is the gen has an external modulation bandwidth of only 100 Khz. At this BW, video is very smeared and grey but useable for tuning up converters and preamps. The HI Z and long leads make it difficult to improve resolution, but by following mod you can increase this to 1.5Mhz or better. First remove the Ext mod input connecotor and tube which is a low pass filter. Replace it with your choice. Mount a 500 ohm pot inplace of the delayed sync output jack. Contruct on a piece of perf board the common base amp shown above. This will give the required 10 volts P-P of video . Connect the output to the long cylinder .1 cap mounted between ext mod input connector and the mod selector switch. Connect the B+ lead to the regulator tube V-106 pin 5 (105 vDC) . The PCB can be insulated with tape and held to the terminal board behind the front panel with tie wraps. To improve resolution, connect a.1 disc cer ceramic of 50 V or more to the cathode of V-103 pin 7 to grid. Also add a 10 mf 450 V cap from the end of the first 4.7K 2 watt resistor off of V-103 pins 1, 2. This can be found on a terminal board on the back of the chassis. The one you want is next to a 1/2 watt resistor and the proper end is towards the chassis top. Turn the unit on and adjust modulation input pot for best pix in ur receiver. Its also good for QRP with its 100,000 uV output!

IF YOU HAVN'T SEEN IT... HERE IT IS!

HOW TO USE SCIENCE WORKSHOP'S UHF/VHF COMBO-VARACTOR-TUNER AS:

(1.) AN 82 CHANNEL TV REMOTE CONTROL.

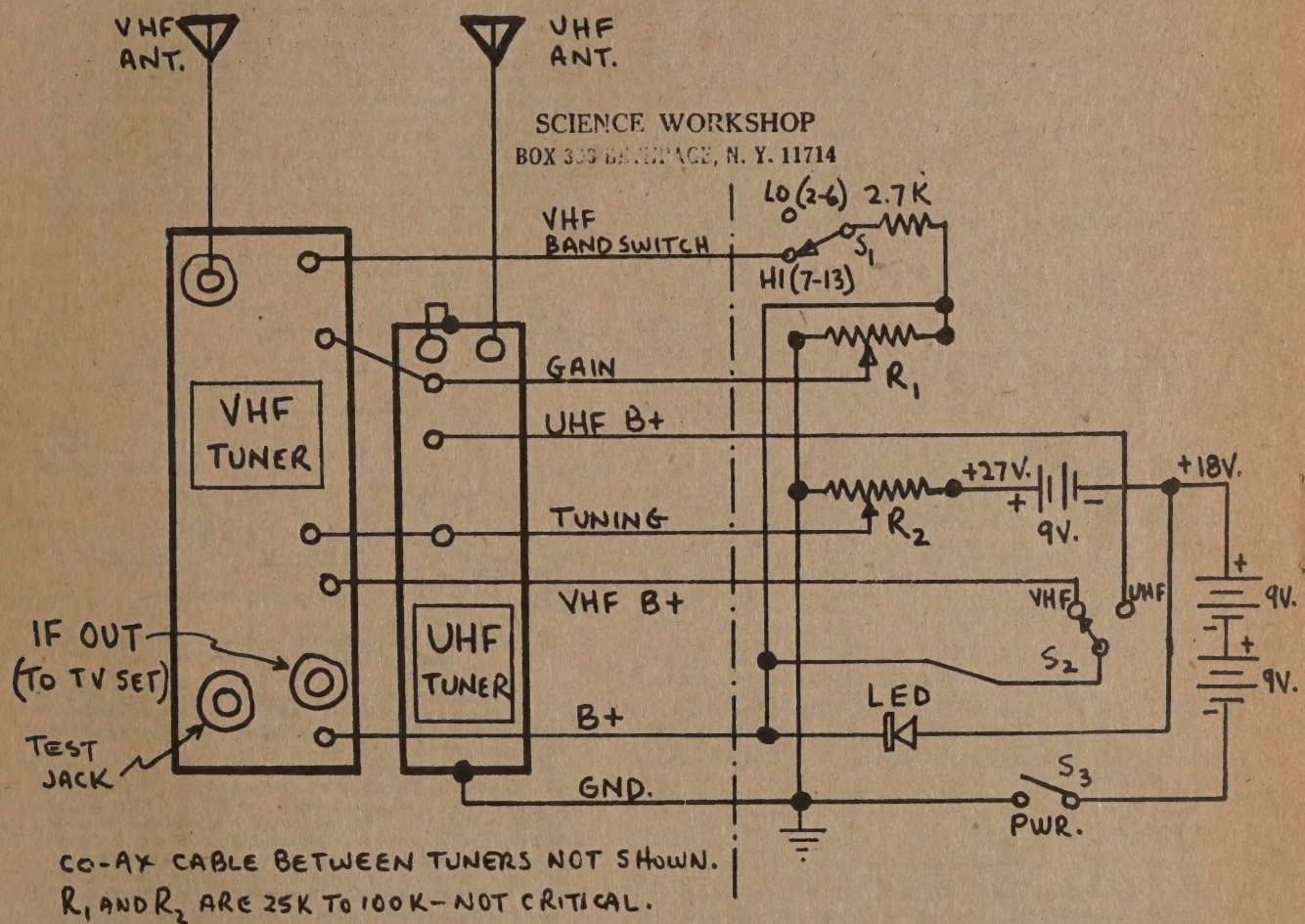
(2.) AN AMATEUR T.V. TUNER.

(3.) A UHF/VHF F.M. RECEIVER, COVERING 6 MTRS., 2 MTRS., 220 & 440 MHZ.

The combination of the Varactor Tuner pair, plus ANY TV set provides operation in any or all of the above 3 modes.

Instructions:

Connect the 2 tuners and controls as shown:



S_1, S_2 and S_3 can be combined in a 3P4T switch labeled "OFF, LO-VHF, HI-VHF and UHF." After the units are wired as shown, pull out the co-ax cable between the UHF & VHF tuners in your T.V. set. Using the co-ax cable provided, connect the Science Workshop Varactor tuner combo to the UHF input of your VHF tuner. Connect your TV Antenna to the Varactor tuners and you now have an 82 channel remote control unit for your favorite T.V.!

CALL	NAME	STREET	CITY	ST	ZIP	PHONE *
K3UFO	AMENTA, THOMAS P.	RT 1, BOX 558	ACCOKEEK	MD	20607	292-5737
SV1CI*	BAROYANNIS	2122 MASS AVE NW	WASH	DC	20008	466-8694
W4POF	BEE, ROBERT W	126 HOPELAND LANE	STERLING	VA	22170	430-3340
W4NJI	BEITCHMAN, JAMES G	7189 WOODMONT RD	ALEX	VA	22307	768-6684
WA3UJE*	BORTNER, JAMES A	1416 CATYN PL	ANNAPO	MD	21401	267-8845
K3IBN*	BOSAK, JOHN A	WITF TV BOX Z	HERSHEY	PA	17033	
WB4DVD	BRAY, MIKE	5800 QUANTRLL#1021	ALEX	VA	22312	379-2111
AA4GB	BRITTON, GEORGE H	603 N ARMISTEAD ST	ALEX	VA	22312	354-8063
WA9GVK	BROWN, BRUCE	4801 KENMORE#1022	ALEX	VA	22304	370-1431
W3EKT	BRUNS, EDWARD LEE	8308 LNGFELLOW ST	NEW CRLTN	MD	20784	459-5325
AE3K	BUCHANAN, JEFF	1405 BAY HEAD RD	ANNAPO	MD	21401	765-6606
W4KFC	CLARK, VIC	12927 POPES HD RD	CLIFTON	VA	22024	631-1360
N4AUH	CLEARWATER, RON	2509 N 20TH RD#406	ARL	VA	22201	525-3474
W4PSC	COFFEE, TOM	4106 GIBBS ST	ALEX	VA	22309	780-8439
W4ESN	CONNAWAY, JIM	639 FREDERICK ST SW	VIENNA	VA	22180	281-4084
W5CQ	CURRY, BILL	11003 BLUE ROAN RD	OAKTON	VA	22124	591-7439
WA3YUV	CURTIS, VICTOR	5122 BOULDER DR	OXON HL	MD	20021	894-3403
WB2BUL*	DEDONATIS, SAMUEL	502 THORNY LA	GLNDORA	NJ	08029	939-1632
*	DEVINE, JOE	5917 WALNUT ST	TEMPL HL	MD	20031	894-4217
*	DUVALL, ROY C.	3332 BUCHANAN ST#301	MT RAINR	MD	20822	864-6634
W3HE	EICH, HOWARD	5950 KEDRON ST	SPRINGFD	VA	22150	451-5439
WA3GRG*	FAESEL, BRADLEY	1 CIRCLE LANE	MCHNCBG	PA	17055	766-8905
W3ODE	FLETCHER, J.R.	7225 BLAIR RD	WASH	DC	20012	726-7761
WA3OWR*	FODNESS, ROBERT L	RD#2, BOX 83	MCHNCBG	PA	17055	697-1886
WB4JFI	FOX, TERRY	1819 ANDERSON RD	FALLS CH	VA	22043	356-8334
W4NCI	GAVEY, TOM	227 S FAIRFAX ST	ALEX	VA	22307	683-6987
*	GILKESSON, AL SR	5304 N ENGLEWD DR	N.ENGLWD	MD	20785	773-8624
WA2VMS	GOBLE, PAUL S	40 BOXWOOD CIRCLE	BRYANS RD	MD	20616	283-2981
WB3FCH*	GOFF, ROD	5228 OXFORD DR	MCHNCBG	PA	17055	766-6584
WA4RBX	GUIN, NEIL	7533 OAK GLEN CT	FALLS CH	VA	22042	573-3057
W3SEM	GURLEY, CLYDE	5018 IOWA AVE NW	WASH	DC	20011	
WB3HXY	HAYNES, ALEX H.	RT 8, BOX 126	ANNAPO	MD	21401	956-2302
*	HOYE, BILL	8 S VAN DORN#U604	ALEX	VA	22304	751-1787
K3VAL	HUTCHINS, ROGER A	13202 MILES CT#303	LAUREL	MD	20811	776-4834
WA3UDY	JACOBS, NOLAN	2261 SEPTEMBER DR	GAMBRLS	MD	21054	621-7984
W3HMS*	JAMINET, JOHN	VALLEY VIEW DR RT1	MCHNCBG	PA	17055	697-4747
KN3SAS*	KENNEDY, JOHN	2115 GREEN AVE	WLLMSPRT	PA	17701	326-6689
WB3JZG*	KENNY, ROBERT	5210 TERRACE RD	MCHNCBG	PA	17055	
W3EGZ	JOHNSON, CLYDE SR	7007 FRESNO ST	ST PLSNT	MD	20027	336-4573
*	JOHNSON, HYLAN	206 WESTMILL AVE	ST PLSNT	MD	20027	336-8675
K4EUX	JONES, ELMER	3918 S 12TH ST	ARL	VA	22204	979-1669
K3PUT	KING, FREDERICK H	3712 CARPENTER ST	SE WASH	DC	20020	584-3575
WA2NSX/3	KNOEPL, JOHN	4816 KENNEDY ST	HYATTS	MD	20781	779-2246
WB3HLC	KOPP, DOUGLAS M	2921 HEMPSTEAD DR	OXON HL	MD	20022	248-7472
W4WHO/3	LAJN, PAUL	13544 GLEN MILL RD	ROCKVL	MD	20850	424-2393
WB4FUJ	LAMM, FRANK	RT 1, BOX 242	LOVTSVL	VA	22080	822-5429
K4PDA	LOVE, FRANK	3837 TAFT AVE	ALEX	VA	22304	751-5994
WB0YDM*	MALLIET, ROBERT	416 E BLUE EARTH	FAIRMONT	MI	56031	
W1ZX	MANK, WILLIE	RT 1# BOX 144D	WALDF	MD	20601	645-5584
WA4SFL*	MAYO, DOUGLAS R	RT 2, BOX 154	BEAVRDAM	VA	23015	288-7985
*	M'BOYA, ALEMU B A	2156-A NEWARK CT	ANDRW AFB	MD	20335	599-9110
WA5NTI	MCCARTY, TERRY G	125 S REYNOLDS#J420	ALEX	VA	22304	
K3TAZ	MERKER FRED	3043 OAK FOREST DR	BALT	MD	21234	663-1373
W2GHK	MEYER, STUART	2412 NEWTON ST	VIENNA	VA	22180	281-3806
WA0DYJ/4	MITCHELL, STU	14761 DODSON DR	WOODBRDG	VA	22193	670-4252
W4MIB	MORAN, BILL	109 MILL ST. NE	VIENNA	VA	22180	938-6924
W3NKF	NAVAL RESEARCH ARC	CODE 9015 NRL	WASH	DC	20375	767-2598
K4OVK	NOVAK, JOE	2420 LUCKETT AVE	VIENNA	VA	22180	
WA4HIS	NYMAN, ERIC	1413 NICHOLAS ST	ARL	VA	22205	536-4326
K0JO	OEHLENSCHLAGER JOHN	3900 DESOTA CT	WOODBRDG	VA	22193	670-5390
W4RL	PECK, RICHARD	752 GRACE ST	HERNDON	VA	22070	437-6516
WA4GUA*	PHELPS, DOUGLAS L	2912 UPEN CT	WOODBRDG	VA	22191	221-2612
W3PJM	PHILLIPS, DAVE	2901 ACCOKEEK RDW	ACCOKEEK	MD	20607	283-2747
WA3YGM	PHILLIPS, DAVID C	4117 WOODBERRY ST	HYATTS	MD	20782	927-9252
W3YAE*	PHILLIPS, MARVIN K	RT.13, BOX 168	FRDRICK	MD	21701	
K3AGR	PHILLIPS, RUTH	2901 ACCOKEEK RDW	ACCOKEEK	MD	20607	283-2747
KA4ATI	PIENCE, ROGER	5039 CLIFFHAVEN	ANNANDL	VA	22003	978-0389
*	PIKE, WALTER N.	3111 FALLSTON AVE	BELTSVL	MD	20705	572-5150
KB4JE	PODBREGER, JOHN & MARY KA4BCZ	5375 DUKE ST#502	ALEX	VA	22304	751-7832
WB4FOR	POOLE, PHIL	1408 IDAHO ST	WOODBRDG	VA	22191	491-4495
N4AFI	POWELL,WILLIAM J	2509 N 20TH RD#406	ARL	VA	22201	525-3474
W3HQ	RAMOS, ED	603 4TH ST SW	WASH	DC	20024	554-4744
WB4BMC	RICH, LARRY	8105 GLOVER CT	SPRNGFLD	VA	22152	451-5205
W4RI	RINALDO, PAUL	1524 SPRINGVL AVE	MCLEAN	VA	22101	356-8918
K7NOK	ROMERO, GABE	9707 DALLAS AVE	SILVR SP	MD	20901	589-0455
WD4AEJ	ROSS, CHARLIE	8056 ST ANNES CT	ALEX	VA	22309	360-7119
WB5MMB/4	SANDERS, ELTON JR	404 PARK ST SE	VIENNA	VA	22180	281-1298
*	SANDERS, NANCY P.	404 PARK ST SE	VIENNA	VA	22180	281-1298
*	SHON, ROBERT	9949 MALLOW ST	MANASSAS	VA	22110	369-6968
WA4IOW	SHORE, JERRY	17700 TWNECRST#201	GAITH	MD	20760	926-0742
K3PNL	SIEBERT, FRED	8357 RESRVOIR RD	FULTON	MD	20759	776-1947
K6PKD	SMITH, ERNIE	17 ARTHUR DR	OXON HL	MD	20022	839-9151
W4API	SPITZ, CHARLES	1420 S RANDOPH ST	ARL	VA	22204	920-4665
WB3JVX	STAFFORD, RUSS	BOX 426	NEW CSTLE	DE	19720	366-8549
K4KYO	STALLS, TONY	909 F ST NE	WASH	DC	20002	543-1347
W3CQB	STRONG, CHARLES	12118 OLD COLNY DR	UP MARB	MD	20870	627-4598
WA3FVI*	TAYLOR, WILLIAM G	734 W SARATOGA ST	BALT	MD	21201	385-8484
K3VDY	THOMAS, LLEWELLYN	2100 BROOKS DR#322	SUITLND	MD	20028	249-5492
WA3YTP	TOBIAS, RUSSELL	4870 BATTRY LA#507	BETHSDA	MD	20014	657-3472
*	TRIANTOS, DAVE	5706 ARAPAHOE DR	FRST HT	MD	20021	839-1952
WA4RVN	TURNER, WILLIAM	11814 WAYLAND ST	OAKTON	VA	22124	620-9292
WB3DVL	WALKER, ERNEST L	8501 SCHOOL RD	BALT	MD	21234	668-0083
W5DFU*	WELDON, WARREN	2304 OSAGE AVE	TULSA	OK	74106	587-5223
W3EW	WESTBROOK, ED	7913 CLAUDIA DR	OXON HL	MD	20021	839-2561
WA3TNR	WHITFIELD, GARY	RFD 1, BOX 148-7	IJMSVILL	MD	21754	831-8544
W3VIY	WILLIAMS, FRANZ	9906 RENFREW RD	SIL SPG	MD	20901	593-8712
W2WLS	WILSON, RICHARD V	1007 COMMONWEALTH	FAIRFAX	VA	22030	323-1173
W3GVG	WISEMAN, MALCOLM L	215 PEABODY ST NE	WASH	DC	20011	529-8760
WA4NYJ	WOLLNER, LIONEL	3306 HORSEMAN LN	FALLS CH	VA	22042	536-4664

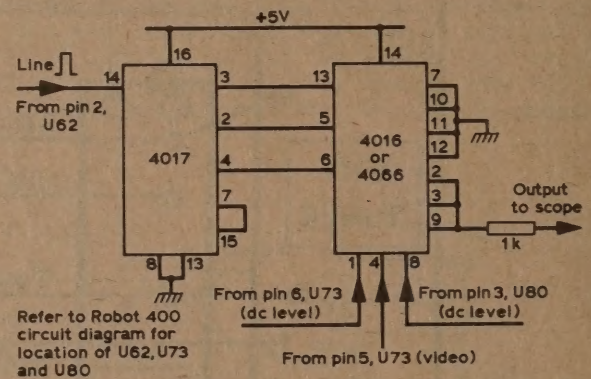
OUR NEW ROSTER -

METROVISION

sstv scene

P. Burnett, G4BLL*

As promised in the December 1978 *SSTV Scene*, the circuit for 'scope readout to facilitate setting of the contrast and brightness controls on the Robot 400 (and copies) is given below. Fortunately no internal (or external) modifications are required to the Robot 400. The 'scope output is simply routed to the spare phono socket already provided on the rear panel, and the four input leads are tacked off the main pc board at the points noted (ie U62, U73 and U80). The 4017 is a divide-by-10 Johnson counter which in this configuration is cleared every third pulse from the fast scan line. The three sequential outputs control the switching of the 4066 quad bilateral switch which presents, in turn, the upper and lower dc levels from the comparator chain and the slow or fast scan video (depending upon mode selected) to the 'scope. A 4016, which has a higher ON resistance, may also be used successfully in this circuit. A 741S or 301 op-amp may be required at the output to increase the signal voltage if an insensitive 'scope (eg without Y-amp) or station monitor is used.


+5V
Line
From pin 2, U62
4017
4016 or 4066
Output to scope
1k
From pin 6, U73 (dc level)
From pin 3, U80 (dc level)
From pin 5, U73 (video)
Refer to Robot 400 circuit diagram for location of U62, U73 and U80

Circuit for oscilloscope read-out for correct brightness and contrast control settings on Robot 400

The circuit for the led sync tuning indicator is similar to that shown in the article "Modifications for the W6MXV and other sstv monitors" (*Radio Communication* May 1978, p404), but R139 is now replaced by a 220kΩ resistor and the input is taken from pin 1 of U63.

Letters have been received from ARS40918 and PA2JJC requesting sstv information and details of any books available. The *Slow Scan Television Handbook* by Don C. Miller, W9NTP, and Ralph Taggart, WB8DQT, published by *73* magazine, is still considered essential reading for both the newcomer to sstv and the established operator. It discusses the relative merits and drawbacks of various sstv circuitry. Full constructional details are given for a simple (but electrostatic tube) monitor by W4TB, and the well-tried W6MXV monitor which is still one of the finest P7 tube monitors available for home construction with a performance reputation even better than the "household name" commercial units. *The Complete Handbook of Slow Scan TV* by Dave Ingram, K4TWJ, as the name suggests, is a more general treatment of the subject and is recommended reading for all sstv followers.

G4CEQ queried the availability of a pc board for a 400-type scan converter. A limited number of boards are available on a first-come first-served basis from VK5PV at a cost of A$98 plus A$9 to cover registration and postage to the UK. Alternatively, negatives should be available in this country very shortly for a Japanese designed board, designated the SC77, and interface keyboard CD78. Further details next time.

The ninth World Wide SSTV Contest will be held on 17 March from 1500 to 2200gmt, and on 18 March from 0700 to 1400gmt. Two-way sstv contacts on 28MHz carry a 5× bonus value compared with contacts on other bands.

Thanks to all who have taken the trouble to write or phone, please keep *SSTV* Scene in the picture! □

*12 Standroyd Drive, Colne, Lancashire BB8 7BG.

Don Miller W9NTP Presents.....

MEDIUM SCAN TV

DESIGN YOUR SYSTEM FROM THIS GUIDE

Specifications for MSTV system for completion of FCC STA two year test period.

128 pixels per line, 128 lines per field/frame. Aspect ratio 1:1. frame rate 2F/s. Pixel clock freq. (128L x 128 P) x F = 32,769 pixels/sec. Line freq. 128 x 2 = 256 Hz. Time of 1 line 3.91 ms. video base bandwidth 32,768/2=16,384Hz. H sync pulse width .4 ms. V sync pulse width 3.91m

The RF transmission method will be direct FM on the assigned frequency of 29.150 Mhz. The transmitted bandwidth shall not exceed 36 Khz. It is of course necessary to preserve the DC bandwidth throughout the transmitter and receiver. As mentioned before, the direct FM of any HF transceiver can be done by using a reactance modulator on the VFO of the TX. The reception can be made on any FM receiver tuning to the correct freq. and having a bandwidth of at least 36 Khz. Old surplus FM rigs may be used. It is planned howe-er, to supply a small solid state receiver meeting all the requirments in a few months. This will be available from Science Workshop, Bethpage, NY. Since it will use the 10.7 IF and 455 Khz FM components it will probably be very reasonable.

For any of you that are interested in getting involved technically, I would like to outline a procedure that I think will lead to success. First of all, David Evans of the RSGB has suggested that if a few of you are really interested in transmitting MSTV video, he will work through the British PO to see if permission can be obtaine- for your operation in Europe.

If you have a Robot 400 or a reasonable copy you will need a second memory board. Bpards that will fit into the Robot box are obtainable at cost from W9NTP. The chips can be obtained from mail order houses or if extreme difficulty is found in obtaining them I will furnish them at my cost. Please note that in no way are these tests being made to promote commercial sales of anything. The investigators of MSTV feel that hams should be advancing the state of the art, and this is our way of doing it.

Refer to diagram 1

Pictures are frame grabbed at 2 fields per second by the Robot. This is compatible with both 60 and 50 Hz operations. The Robot memory not being loaded is viewes by the local monitor. During this period of time (.5 sec) one of the small static buffer memories is loaded at display rate for 8 lines while the other buffer is transmitting its 8 lines at 16 Khz. The two buffer memories alternate in loading fast scan and unloading slow until one complete frame grabbed image has been transmitted. The other Robot fast dynamic memory is now loaded and the procedure continues unloading and loading the two buffer memories. The only problem is the speed of the 21L02's. It will probably be necessary to write two pixels simultaneously into them. If you use slower memories yet it is possible to write 4 pixels in parallel. The only problem this could cause later is the slight possibility that a given pixel might need to be loaded individually. The receiver is the inverse of the above. It will be necessary to recover the sync and load the buffers alternately and transfer the data to the dynamic Robot display memories. This should be no problem. As circuits are developed please send them to W9NTP and A5 so we know your successes and failures. We need to share our info to minimize duplication of effort and wasting time trying methods already proved not workable. The W-NTP beacon will continue to transmit info on the first 10 minutes of each hour (saturday) on 29.150 Mhz.

COLOR CONVERSION OF THE ROBOT 400

The writer has experimented with many systems for transmitting color slow scan TV over the years. There are several very successful methods but many are too complicated for the average builder. It is for this reason that a modest conversion of a successful commercial scan converter is discussed in this article. Color itself is complicated and has technical limitations even in fast scan NTSC systems. Slowed down versions of the NTSC system are possible and experimenters such as W6MXV have spent considerable time working on them. After all directions are explored it was deceided that the place to start in color SSTV was to get many hams operational in the simplest way possible. This article is written toward that end.

Color pictures can be produced in a variety of ways. Most natural colors can be reporduced if three sources of video are provided whose images have been subjected to three filters that pass different spectral frequencies. Commercial TV encoders use Red, Green, Blue, or two colors and a luminance signal called Y. It is also well known that color pictures can be produced with only two sources of video which have been derived from scenes viewed through magenta and cyan, the familiar Land Principle.

The author built both systems and the colors produced from a three camera system are superior over those produced from a two color camera system. It turns out that there is much more to consider however. Many color TV investigators fail to complete their systems by not developing the capability of transmitting the color pictures over a data link such as radio. Of course, color can be transmitted over a radio path three times the bandwidth of a black and white TV signal, or over three coax cables This is not acceptable to the amateur or the FCC.

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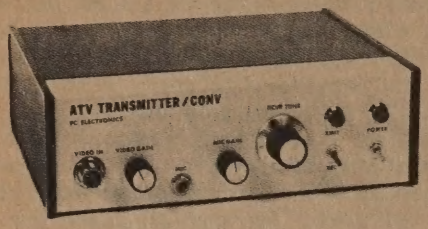

COMPACT
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ATV TRANSMITTER/CONVERTER–TC-1 $399.00 ppd
All you need in one box. Contains the TXA5-2, PA5, TVC-1b, FMA5 modules described below in an attractive cabinet with regulated power supply and solid state T/R relay. Specify 434.0 or 439.25 mHz transmit and TV receiver channel 2 or 3. Connect to antenna terminals of any set, add a good 450 antenna, camera or computer and you are ready to show the shack, home moves, computer games, etc. 12-14 VDC and AC version add $30. On carrier audio . . . add $50. SOUND SUBCARRIER STD.

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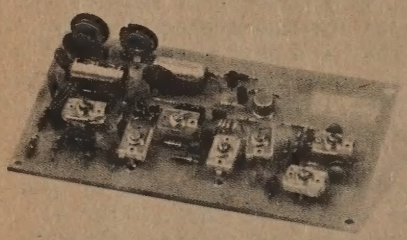
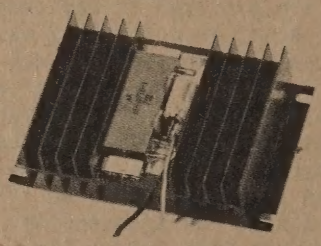


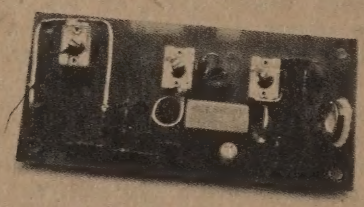
ON BOARD
MODULATOR

TXA5-2 ATV EXCITER . . . . . $69.00 ppd
This is a wired and tested module designed to drive a Motorola MHW-710 power module to 10 watts output. (The MHW-710 is part of the PA5 module below.) The TXA5-2 consists of a crystal oscillator operating in the 100 mHz region to keep any harmonics out of two meters, two doublers and a final. The high resolution video modulator (8 mHz) drives both the final and 2nd doubler for good linearity. Also DC restoration is used to give max power on sync tips and black blacks regardless of picture average level. Requires +12 VDC reg @ 70 ma, and crystal. (International type 473160 f/4) Tuned with xtal on 434,439.25, or 427.25 . . . add $15. CA-1 on carrier audio/18mHz osc module add $39.

FULL 10 WATT
RMS POWER
ON SYNC TIPS



PA5 10 WATT ATV POWER MODULE . . . . $79.00 ppd
The PA5 will put out 10 watts of high resolution video when driven by the TXA5-2 Exciter or VHF ENG. TX-432B (attenuated down to 80mw). TXA5 modulation matches the PA5 gain curve to give good linearity for color reproduction.
Requires 12 to 14 vdc reg @ 3.0 amps and 80 mw drive.



*IMPROVED
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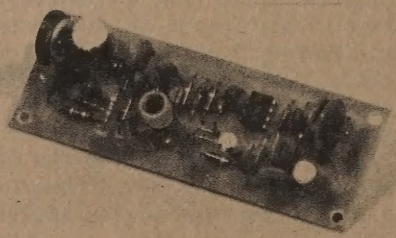
TVC-1B ATV RECEIVING CONVERTER . . $49.50 ppd
Very sensitive MRF901 (1.7 db nf) preamp and double balanced mixer module digs out the weak ones but resists intermods and overload. Connects between antenna and TV set tuned to channel 2 or 3. Varicap tuning (420 to 450) allows remoting at antenna to save coax loss. Requires 10 to 18 vdc @ 20 ma. Super sensitive TVC-1C with NE64535 (.9 db nf) preamp . . . $79.50 ppd



FMA5 AUDIO SUBCARRIER GENERATOR . $24.50 ppd
$4.00 Board
Put audio on with your camera video. Connect your low Z (200 ohms) dynamic mic, >10 VDC @ 25 ma, TXA5-2 or any of the VM-1,2,3 modulators and you are set to show and tell. The FMA5 has lots of mic gain and a soft limiter for pick up to 25 feet. It modulates a 4.5 mHz VCO to the full TV standard deviation of 25 kHz. Works with any transmitter having 5 mHz video bandwidth modulation. NOW WITH ON BOARD 5V REGULATOR!

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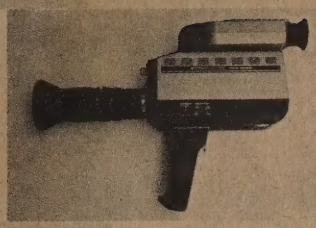
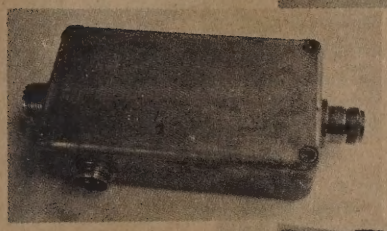
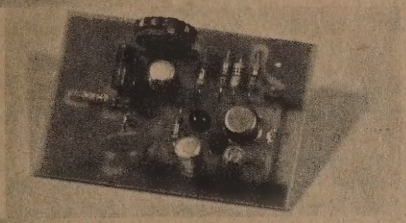
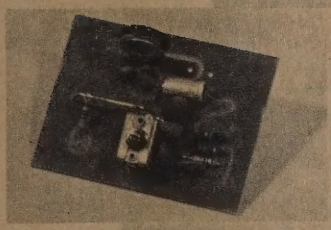


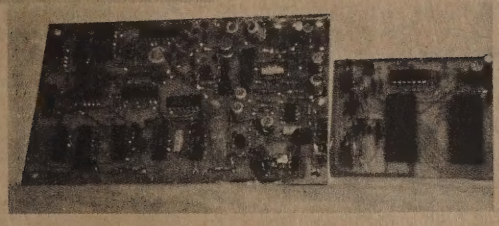
U SAW IT ON THE AIR AT DAYTON



NEW







VIDEO MODULATORS

VM-1 TUBE TYPE ATV MODULATOR . . . . $15.00 ppd
for tetrode 5894, 6907, 6524 tubes. ie, CMU15.

VM-2 HIGH POWER TUBE MODULATOR . . $19.50 ppd
for 4X250 tubes such as in K2RIW amp (apr 72 QST).

VM-3 TRANSISTOR ATV MODULATOR . . $19.50 ppd
for 1 watt xmtrs such as VHF ENG. TX432B exciter.

All modulator pc boards only . . . $3.50 ppd

***COLOR CAMERA HITACHI GP-5 . . . . . $1295.00 ppd**
Semi professional quality 3 electrode stripped vidicon for superior color reproduction. Built-in 1½" monitor, speaker, and microphone. 6:1 ZOOM lens. Can be run on external 12vdc @ only 900ma for portable or mobile work. Variable color temperature control. Small and light . . . 4.8 lbs.

TVC-12 1200 MHZ ATV CONVERTER . . . . $79.00 ppd
Tunes 1215 to 1300 mHz from the shack. Can be mounted at antenna to save line loss. Outputs on channel 7 or 8. Req. 12vdc reg @ 20 ma and 10K pot. High rejection to 439 when used with SI loop yagi for full duplex ATV. LOOP YAGI 58.35 + SHIPPING

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RF/VIDEO DETECTOR & MONITOR . . . DM-1
Connects to antenna coax to sample the xmtr RF. Receiving your own RF can be misleading. This module detects the actual modulation and drives a monitor. Also gives relative power. 10 to 18 VDC @ 25ma.
PC Board . . . $4.00 **Complete, tested . . . $17.50**

ATV TEST GENERATOR . . . TVG-1
Connect your camera and you have about a 1 mw transmitter on the air to check out your receiver, antenna, give demos, etc. Just a simple modulated oscillator set between 420 and 450 mHz.
Requires 9 VDC @ 5 ma.
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VIDEO CALL IDENTIFIER . . . VID-2
SUPERIMPOSES YOUR CALL of any 6 alphanumeric combination over your camera video. A must for repeaters. Connects in coax line between camera and transmitter. Has internal sync separator, so no digging into the camera for vert and horiz drive. Controls for position, in/out, black/white, and 2 camera video switcher. Requires 12 VDC @ 200 ma.
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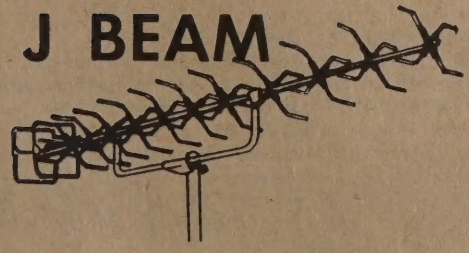
VC-1 VIDEO CLOCK-6 digit 12/24 hr. . . . add $49.00

J BEAM



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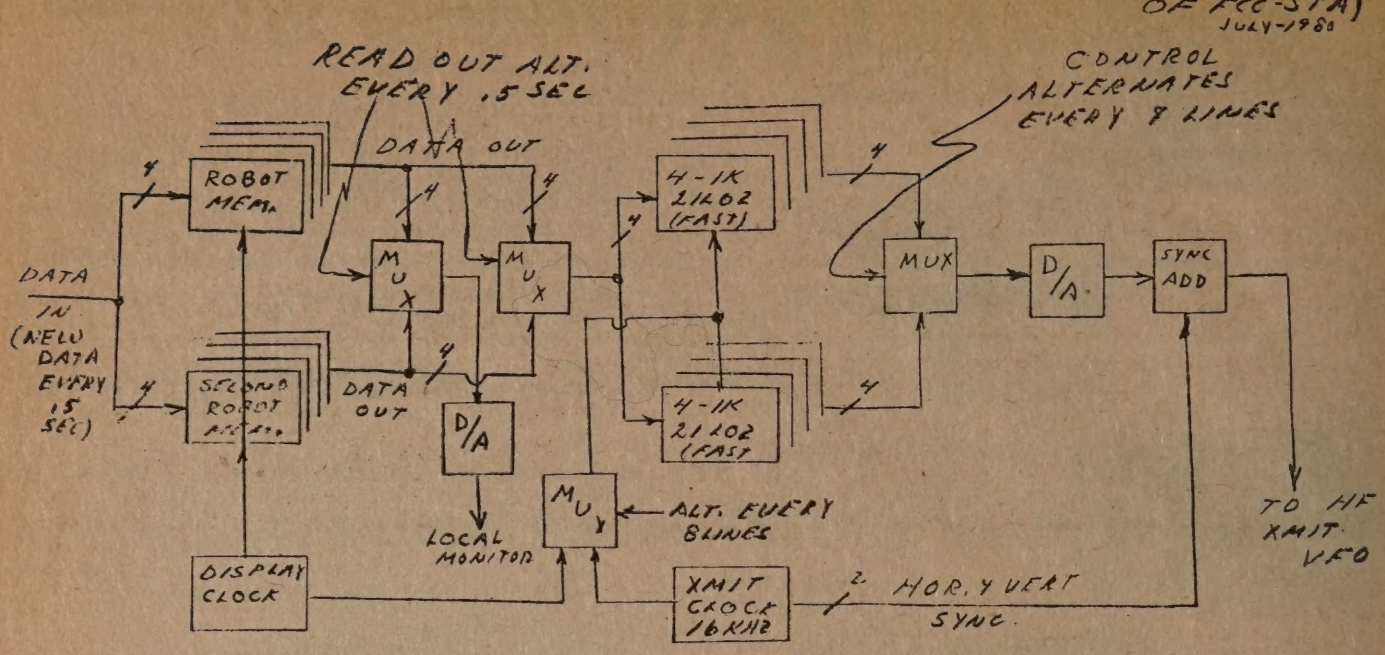
73, TOM W6ORG P.C. ELECTRONICS, 2522 PAXSON LANE, ARCADIA, CA 91006



The commercial answer answer was of course quadrature modulation but this makes it necessary to develop complicated new gear on both ends of the transmission path. Is there another way?

Let us look at a time multiplexing system. All of us remember the early days of television when field sequential TV almost made it to our living rooms. Could this system be used in color SSTV? Since SSTV is not bothered by flicker it may be extremely useable. The "price" paid in using this method is that instead of using more bandwidth we use more time. Before cutting too many holes in the Robot 400 let us take a look at what we can use for a cheap color camera. Afterall this is to be a cheap and simple conversion to get all of you SSTV'ers on color. A very simple conversion to get all of you going with perfect color registration and high signal to noise video in low light conditions can be built at very little cost over that of your present black and white camera. Two filters from Christmas decorations can be held in front of your camera lens while two images are loaded into the converted Robot . The Robot being converted to two memories. It can be done automatically with a synchronized color wheel. Doesn't this sound easy? Before going ahead let us list the things you must do to convert your Robot 400 into a beautiful color SSTV station.

1. Obtain a standard Robot 400 digital scan converter.
2. Add one additional memory board. this article tells you where you can obtain the hardware.
3. Hold two celophane red and green filters in front of your black and white camera for a total of two 1/60 sec periods. Push the "snatch" button on the robot to load each memory.
4. Transmit your color picture in field sequential mode for the next 16 seconds.

Before preceding ahead with the conversion you should be warned that this modification makes null and void the warrenty from the manufacturer. Afterall, unless you are an experienced solid state builder you have no business inside a digital scan converter. The writer has always felt that unless a ham shack shows the results of the ham's technical personality (homebrew or modified commercial gear) he has no right to have personal price in his equipment. In this day and age time is worth more than money. Now let us proceed with the color conversion of a fine piece of ham gear.

All this is added to the original gear is one additional memory board with the proper switching of the input and output signals. Random Access Memories (RAM) are easy to multiplex. In this case of the 2107's the write lines are multiplexed. The other wires, chip enable, chip select an and data in are connected in parallel with the other original memory through buffer gates.

The fast scan output of the new memory is brought out to a new output jack in the back panel of the Robot. The SSTV output is connected to an original analog switch internal to the original circuitry. It is also necessary to add an external fast scan sync output for a color encoder or to the R B G color monitor. Once the color images are loaded into the two memories, many display possibilities exist. The two R and G signals can be used to "fake" a blue signal. If it makes the builder feel better, he can consider the R to be Magenta and the G to b be Cyan. This means that the original transmission had some blue in each image The best way to add "blue" is to have the sender include in the picture a small rainbow pattern. When the receiving station records the picture a small amount of DC blue can be added until the colors match what is known to be accurate. The writer did not think of this himself, the JPL lab which sent the probes to Mars used an american flag to ccurately set the proper levels to reproduce the flag. When this was done the red sky became evident. Another advantage of this manual system is that it makes it possible for the sender to send each image at full signal strength. This means that no matrixing is necessary at the transmit end.

The converted two memory Robot 400 can now be connected directly to the color TV set by making connections to the color internal circuits. This necessitates modifying the set for RBG input. This is not difficult and is recomended if you do not mind connecting and modifying your ham shack color TV set. However, if you are like most it is possible to build a color encoder (as displayed at Dayton) to connect from your newly modified Robot to the antenna terminals of your color set.

By the first of July both the color memory board and the color encoder board will be available with full documentation. If you are interested in obtaining these boards please contact : Don C. Miller W9NTP, Waldron, IN 46182. The price of the color board is $30 and the price of the color encoder board is $10. This is only recommended to the experienced IC builder.

It will necessitate having available a CRT and the builder should have the ability to trouble shoot digital circuits. Since this is not a com commercial project but only to promote home-brew ham radio projects, no responsibility will be taken by the designer for mistakes in design burned out IC's or other mechanical problems. Don't let me frighten you. Three color boards have been built and installed without any problems. By the way, most of the IC's can be purchased from Jade or other well known surplus houses. LET ME HEAR FROM YOU ROBOT OWNERS!
73 Don W9NTP. ARRL cen. Div. Director

LETTERS, THIS AND THAT

Phil and Jane of Chicago took some nice video tapes at Dayton of the various ATV demos and displays/fleas. They were nice enough to send a special copy which has some extra added video effects added and has been well edited for presentation. It will be available for showing at the various conventions A5 attends if a local OP will supply a U-Matic (Sony 1600 or similar) 3/4" tape machine and monitor. They are video hobbists and not into ham video and have exhibited some real creative talent including a video computer controlling the effects used in making the tape. The program is 1/2 hour long. A copy can be made if you want to send A5 a tape and SASE return postage.

+++++On march 14th and 15th, an ATV demo was given at Knotts Berry Farm, an amusement park in Buena Park, CA. The demo was welcomed with people amazed at the pictures comming from WA6ZMI, Lee in Westminster, P-5 from 10 mi. K6KMN Doug at Mt. Wilson was also receiving the pix 45 miles away P5! Several girls lined up in front of the color camera and were skeptical that there was really a two way video link with Doug until he described them in detail! K6VLM Sam showed a pool game he was playing. At the demo site gear included a 15 ele yagi up 45 feet loaned by WA6SXU. Rigs were home brew WA6SVT's 10 watt TX and converter. The color camera was on loan from WA6BAV. The demo was a success with many people being attracted to the Amateur Radio Exhibit in the same tent as the ATV group. In addition to fixed contacts a portable unit was carried around the park including the 300 foot high Sky Tower ride. Many folks were surprised that hams sent pictures and many of them later went to the tent to see the demo. Contacts with other stations included WB6BAP Ernie, WA6CWM Scott, WA6YJM Kinny, K6KMN Doug, W6ORG Tom, K6VLM Sam, WB6PEX Martin, WA6ZMI Lee. Demo ops were WA6SXU, WA6 BAV and WA6LGY. Tnx to all who helped. 73 WA6SVT

+++++Mike Stone WBØQCD of Durant Iowa suggests that we offer a MASTER SCANNER AWARD for 25 contacts on 10 meters for the General class SSTV stations. What say folks ??? Sounds good to me. Contacts made after July 1, 1979 will count. Send ur QSL's or cassette tapes to A5 with return postage for the award.

+++++WA9BSO is trying to survey ARRL membership to see if they would like to vote for the President. Send ur comments to John.

+++++Got a note from John W9LFI who says that we n need more detail in the construction projects for the beginners. OK. But if the author doesn't sen send it in, we can't print it, cause I'm not going to add copy or diagrams for projects I didn't do! SPEAKING OF PROJECTS. WE NEED SOME MORE ARTICLES NOW. SSTV KEYBOARDS, MODS, FSTV EQUIPMENT, ANTENN AS, YOU NAME IT. IF YOU DON'T SEE IT HERE IT'S BECAUSE YOU DIDN'T SEND IT IN!!!!!!!!!!!!!!!!!!!!

+++++Bobby W6WDL says you can have a rubber stamp made from ur own art work for a quick SSTV imprint on ur existing QSL's. Hers has a TV set with a line drawing portrait, call and SSTV letter in. Looks nice.

+++++Ernie WB6BAP gets credit for our front cover photos this month.

+++++Tom W6ORG says his next product (PC Electronics) will be a TRS-80 interface/camera superimposing unit.

+++++Amateurs building and selling decoders for the special pay TV channels around the country may be surprised as one was when the FBI showed up to tell them that it was illegal to make and sell them knowing that they would be used to "steal" the special service TV signals. Beware!

+++++Jack Jackson WB4EFZ says he was able to get a T-282 from the FAA which was taking them out of service in his area of SC. These make dandy ATV fire breathing dragons, either as amps or full TX. Mods are clean and simple (a husky wrench works FB to tune the final amps for 439. We will print schematics and notes in an upcomming issue of A5. One here in the A5 shack puts out 200+ watts of video with 4 watts drive!! more if you get inside and re-do the PS.

+++++Folling from Baltimore TV Club paper....

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All kits in stock have most of the parts.

DO IT ON TV!

SATELLITE SEMINAR SPTS-79

August 14-15-16, 1979

News Release

LOW COST SATELLITE TELEVISION - Keynote of SPTS '79

Less than 47 months after the cable television industry first began utilizing geo-stationary satellites for program relay, and cable system satellite television receive terminals were priced in the $100,000 - $125,000 range, Satellite Private Terminal Seminar '79 (SPTS '79) will unveil how high quality, frequency agile private (backyard) satellite terminals are now being constructed for under $1,000 each.

August 14-16 in Oklahoma City, Bob Cooper (former editor in chief for CATJ magazine) is sponsoring a three day international technology conference designed to demonstrate just how far low cost satellite television receive terminals, operating in the 3.7 - 4.2 GHz frequency bands, has come in the past year. Typical of the instructors at the seminar are Taylor Howard of California and Robert Coleman of South Carolina. Howard, a professor at Stanford University and a world respected designer of geo-stationary and deep space satellite probe hardware, is believed to have been the first private individual with a satellite television receive terminal. Howard's terminal, which can be duplicated for under $1,000, has been in operation since September of 1976. Howard's terminal electronics is original throughout, provides full 24 channel tuning and is of modular design.

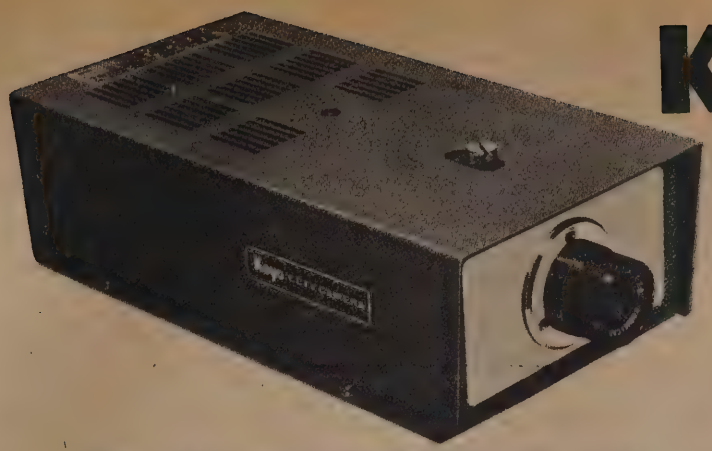
Robert Coleman has assembled his private terminal for approximately $200 in total cost; using 'surplus equipment' which he obtained over a 6 month period of time. Coleman is believed to be the first individual operating on a private basis to design and make work state-of-the-art GaAs-FET low noise amplifiers for this service. Coleman's receiver electronics cost him less than $50 to assemble and put together!

Robert Coleman of South Carolina and his $200 satellite TV terminal.

Both Coleman and Howard will be program-instructors at SPTS '79, along with 19 other individuals who have developed low cost 10-16 foot antennas, amplifiers and receivers for this new marketplace. Also on hand will be commercial suppliers of hardware and software services anxious to learn more about this new marketplace.

For more information, contact Bob Cooper at SPTS '79, P.O. Box G, Arcadia, Ok. 73007 (405/396-2574).

Caption: Robert Coleman of South Carolina and his $200 satellite TV terminal.



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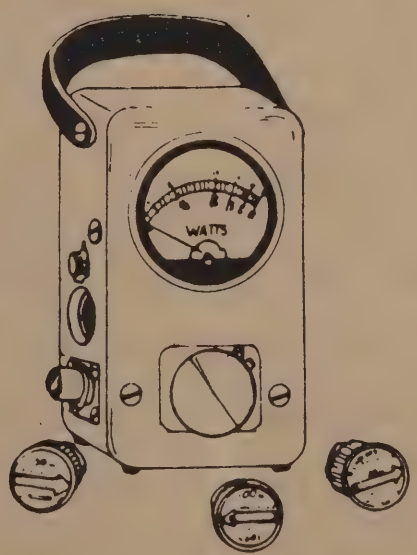

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GENERAL DESCRIPTION

The UNIMETRICS DURA SCAN-4 is a compact all solid state FM receiver capable of automatically scanning up to 4 crystal controlled channels in either the 30-50MHz, 150-170MHz, or 450-470MHz bands, as determined by the RF module inserted into the front end. In the automatic scanning mode, the receiver will continuously scan up to 4 channels in the selected band, locking onto the first channel on which a voice transmission is received. Upon the cessation of the transmission, automatic scanning will resume until another transmission is received on one of the channels. An instant reading, digital read-out indicator shows the channels being selected at all times. A "lock-out" switch for the first (1) channel permits skipping of this channel you do not wish to scan or monitor. The receiver can also be operated in the manual mode to select any desired one of four channels. Interchangeable RF modules permit the receiver to be operated on any of the three bands mentioned above.

Designed and built for reliable, trouble-free performance, the receiver-uses rugged heat-resistant transistors, ICs and dual gate FET in all critical areas. Silicon transistor is used in the oscillator circuit, a mos-FET in the RF stage, and ICs in several stages such as IF stages, audio circuits and automatic scanning circuits. Current drain on 13.8 volts DC is exceptionally low, permitting continuous monitoring in mobile operation for a long period of time, even with automobile's motor switched off.

NEW

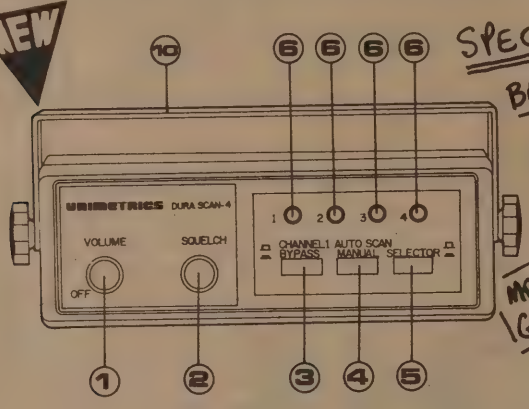

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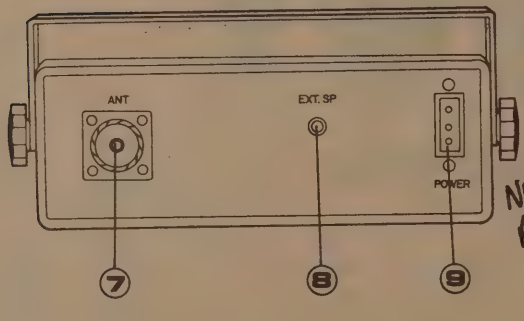
Figure 1
FRONT PANEL



FACTORY PACKED CARTONS. NEW - NOT REBUILT!

Figure 2
REAR PANEL

OPERATION CONTROLS AND FEATURES

1. OFF/VOLUME - turns the power on or off and varies sound output from the speaker.
2. SQUELCH - This control is used to "quiet" the receiver during "no signal" conditions. Degree of sensitivity to incoming signals is adjustable. Full clockwise provides maximum squelch.
3. CHANNEL 1 BYPASS SWITCH - This switch depressed in position permits skipping of the first channel during autoscanning or manual modes of operation.
4. AUTO SCAN-MANUAL SWITCH - Selects mode of operation for the receiver, either automatic scanning or manual selection of the channels.
5. MANUAL SELECTOR SWITCH
6. CHANNEL INDICATORS - Insta position selected (one through fo
7. ANTENNA CONNECTOR - Fo
8. EXT. SPEAKER-PHONES - Allo external speaker for remote op internal speaker.
9. DC POWER CONNECTOR - DC p
10. MOUNTING BRACKET - Specia under the dash – has "quick-rele

WARNING! YOU'LL KICK MISS OUT ON THIS ONE! SPE

COVERS UHF (+ HI-

FREQUENCY RANGE .....

RF MODULES NOT AVAILABL

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SELECTIVITY .....
ANTENNA .....
SIGNAL TO NOISE RATIO .....
BANDWIDTH .....
INTERMEDIATE FREQUENCY ...
SPURIOUS RESPONSE REJECTION
AUDIO OUTPUT .....
IMAGE RESPONSE REJECTION ..
SCANNING RATE .....
CURRENT DRAIN .....
POWER SOURCE .....

DIMENSIONS .....
NET WEIGHT .....

RECEIVERS ARE SUPPLIED WITHO

* Operation on any of these three b RF modules in the front end. Ad shipped with one module UHF)

CHANGIN

This receiver features interchangeable to be operated on any one of the thre

To replace RF modules, proceed as fo

1. Remove the top and bottom cov
2. Remove 4 screws at side of recei
3. Unsolder and remove the leads c
4. Remove existing module.
5. Insert the new module, attachin on the module. When all lead secure the module in place by

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his switch used to manually select channel.
eading, digital read-out indicator shows crystal
tenna lead-in cable with matching connector.
se of headphone for private listening or 8-ohm
on. Insertion of plug automatically silences
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feature for fast removal of receiver.

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* [VHF high band] 150 to 174MHz, Total Spread 8MHz
* [UHF band] 450 to 470MHz, Total Spread 8MHz
... 0.5μV for 20dB quieting
... 60dB down at ± 25KHz
... 50ohm (impedance)
... 30dB, 1μV, 1KHz at 5KHz deviation
... 15KHz (-6dB)
... 1st IF: 10.7MHz, 2nd IF: 455KHz
... More than 70dB
... 2 watts maximum (V.C. imp. 8 ohms)
... More than 55dB
... Approx. 15 channels per sec.
... Less than 500 miliamperes
... Operates from 11.5 to 14.5 volts DC Negative Ground only
... 6-1/4" (W) X 8" (D) X 2-1/8" (H)
... 4 lbs.

CRYSTALS.
s possible through the use of interchangeable onal modules available at extra cost (units are

RF MODULES

modules for the front end, permitting any unit vailable bands.

vs:

f the receiver.

bolding module plate.

ected to the terminals on the module.

soldering) the leads to corresponding terminals ave been connected to their proper terminals, eans of the four screws previously removed.

SEMICONDUCTORS

UHF TUNER — Double conversion front end.

Q101	2SC1070, UHF RF Amp.
Q102	2SC288A, Converter (56MHz) 1st IF
Q103	2SC838, 1st Local Oscillator (45MHz)
Q104	2SC839, Tripler (135MHz)
Q105	2SC387A, Tripler (405MHz)
Q106	2SK23A, 1st Mixer (10.7MHz) 2nd IF
D101 — D104	1S1555 Switching Diode

MAY BE USEABLE AS ATV CONVERTER?? 432 TO CHAN. 2 ??

VHF HIGH BAND TUNER

HI-VHF-RF MODULE 9.95

Q101	3SK39, VHF RF Amp.
Q102	2SC838, 1st Local Oscillator
Q103	2SC839, Tripler
Q104	2SK23A, 1st Mixer (10.7MHz)
D101 — D104	1S1555 Switching Diode

IF & AUDIO SECTION

Q301	2SC838, 2nd Mixer (455KHz)
Q302	2SC838, 2nd Local Oscillator (10.245MHz)
IC301	TA7060P, 2nd IF Amp. (455KHz) 3rd. IF (UHF)
IC302	TA7061AP, 2nd IF Limiter
D301 & D302	1N60, FM Detector
Q303	2SC900, Audio Amp. & Squelch Gate Control
IC303	TA7062P, Audio Driver Amp.
Q304	2SC900, Squelch Noise Amp.
Q305	2SC900, Squelch Noise Amp.
Q306	2SC945, Squelch Switching.
Q307	2SC945, Squelch DC Amp.
D303	1S1555, Temperature Compensation
ZD301	AW-01-09, AVR
D304	F-14A, Polarity Protector
TH301	19D-47, Audio Power Amp. Temperature Compensation
TH301	19D-47, Audio Power Amp. Temperature Compensation
Q1	2SC1096, Audio Power Amp.
Q2	2SC1096, Audio Power Amp.

AUTO SCAN SECTION

Q201	2SC945, Multi-Vibrator
Q202	2SC945, Multi-Vibrator
Q203	2SC945, Vibration Stoper
IC201	μPB213C, Flip-Flop
Q204	2SC945, Logic Circuit
Q205	2SC945, Logic Circuit
Q206	2SC945, Logic Circuit
Q207	2SC945, Logic Circuit
Q208	2SC945, Master Switch for Channel 1
Q209	2SC945, Master Switch for Channel 2
Q210	2SC945, Master Switch for Channel 3
Q211	2SC945, Master Switch for Channel 4
Q212	2SC509, AVR
ZD201	RD6A, Zener Diode for AVR

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RESULTS OF THE ANNUAL ANTENNA MEASURING PICNIC

CALL	ANTENNA	DB over ref dipole
W6ORG	Dual 48 element J beams	+16
WA6SVT	homebrew 15 element Quagi	+14
W6ORG	KLM 27 element yagi	+13
WB6BAP	homebrew 8 element Quagi	+11.5
WB6LQP	homebrew 15 element Quagi	+9
WB6BAP	homebrew 4 element yagi	+8
WB6ZPN	cutdown cushcraft yagi to 4 el.	+4
K6YGX	homebrew coax colinear omni	+4
K6YGX	6 element yagi	0
K6YGX	ground plane	-2

Thanks to Austin K6YGX for donating the first prize of the Playboy puzzle. It makes a great test pattern!

Mike WA6SVT followed Dianes WA6MVDs plans for the Quagi exactly and got the same +14 dbd as she got last year. The J beam is basically a Quagi with broad banded crisscross directors, so it looks like Quagies rule. KLM sent down one of their broadbanded atv 27 element yagis for test. It was only 1 db below the quagis but the same as the old cushcraft DX420s with balun as measured before. We noted that with John WA6ZPNs yagi that you cant get theexpected gain out of a 11 element design when itis reduced to 4 elements. The spacing and demensions have to be right for the total number of elements such as Ernie WB6BAPs 4 element.

**The KLM 27 Element is available for dealers cost ($61.22) from W6ORG. KLM said either let one of the gang have it at cost or ship it back (I dont want to disassembel it!) Reg price is about $50 for the ant and $25 for the balun.

WANTED.W6ORG needs a schematic or the loan of the manual for coping of the TS 419/U 1-2 gHz signal generator. If one can be found then a modulator and modiification can be made for video and put in the bulletin. It will make checking 1200 converters and preamps much easier.

1200 is getting popular. Those with gear are: WA6MVD, WA6MDT, WA6SVT, WA6BAV, W6YFT, K6KDO, W6ORG, WB6HMW, WA6ZMI, & K6YGX.

The repeater is all done and just waiting for the owners of the site to have time to go up and install it at Johnstone. One mod was made to the COR. If a station was on the edge of tripping the machine on it would chatter so some hysterisis was put in. The signal must now drop 2 db below the trigger point to fall out. The trigger point is about P2 in picture quality and may be changed as we see what works the best for the most.

With the repeater up coordinating on 146.43 will even be more important. Rather than QSYing to another freq it will mean more patience to take turns or at least make sure when running simplex that there is no interferance to some one running repeat.

There have been some good skip conditions already this summer. The best times to try seem to be when the fog is lifting or at sundown. WB8ELK in Goleta has seen K6YGX and WA6SVT...about 100 mile shots with some terrain obstructions. Signal go up and down sometimes in 1 minute cycles and vary between stations only a few miles apart. Its like the mountains are there sometimes! Thom WA6IGY measured the P432VD MRF901 Preamp ($23 W6ORG) at 1.03 db noise figure. CU ON 146.43 and 434!

Frequency	Entrant	Description	Gain (dBd)
432 MHz	WB6NMT	2 stacked K2RIW yagis, 6' spacing	+14.9
	"	" " " " 7' "	+14.7
	WB6JQY	" " F9FT yagis, 6' spacing	+14.7
	"	" " " " 5' "	+14.2
	WB6NMT	" " K2RIW yagis, 5' spacing	+14.2
	WB6JQY	" " F9FT yagis, 7' spacing	+13.7
	WB6NMT	K2RIW 19 el. yagi #1	+13.7
	"	" " " " " #2	+13.2
	WB6JQY	F9FT 21 el. yagi #1	+12.7
	N6TX	KLM 16 el. long-boom yagi	+12.3
	WB6JQY	F9FT 21 el. yagi #2	+11.5
	WA6NCT	KLM 13 el. yagi	+10.3
	WB9KMO	14 el. yagi	+ 9.5
	K6LMN	10 el. quagi (modified Cushcraft)	+ 9.2
	WA6BAN	24 el. double expanded colinear	+ 9.2
	W6XN	8 el. quagi	+ 8.7
	WB6YPT	7 el. loop yagi	+ 8.2
	WB6TJO	7' TV dish, unconverted	+ 3.2
	K6FV	Helix	- 1.3
	W6OAL	Big red horn	- 2.3

ANTENNAS

WEST COAST
UHF CONFERENCE
MAY 79
DE W6ORG

NOISE FIGURE MEASUREMENTS

Preamplifiers

Frequency	Entrant	Description	Gain (dB)	Corrected NF (dB)
3.3 GHz	WB6TJO	HP TWT amp.	30	28
2.3 GHz	WB6TJO	HP TWT amp.	30	28
1.3 GHz	W6NBI	2-stage MS2110JE	22	1.9
	K6JKQ	MicroComm RA-23	10	2.8
	WB6TJO	MRF901	8	3.3
	W6VSV	"	13.5	3.9
	WB6TJO	NE021	11.5	6.7
	"	BFR91	2	11.3
432 MHz	K6OJM	HP 505	14	0.9
	WB6JQY	Lunar PAE432-5	15	1.2
	K6JKQ	" "	16	1.2
	WB9KMO	Watkins-Johnson amp.	25	1.2
	W6NBI	MS2110JE	17	1.4
	W6OAL	42141	17	2.1
	W6SDM	3N225A	19	2.6

Converters

Frequency	Entrant	Description	NF (dB)
10 GHz	N6TX	Modified Gunnplexer	9.4 DSB
	"	Unmodified Gunnplexer	14.4 "
3.3 GHz	N6TX	MicroComm MX-4200	5.2 "
	"	RHG DM1-12	7.0 "
2.3 GHz	N6TX	MicroComm MX-4200	4.0 "
	"	RHG DM1-12	7.1 "
1.3 GHz	K6JKQ	Microwave Modules MM1296/28	7.5 "
	N6TX	" " "	7.6 "
	WB6TJO	" " "	9.0 "
432 MHz	W6SDM	Homebrew (MRF901)	2.0 SSB
	WB9KMO	Microwave Modules MM432/28S	3.0 "
	K6JKQ	Janel 432CA	6.0 "

CQ SSTV DE K4TWJ
DAVE INGRAM

Contributing Editor
Amateur Television Magazine

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VR6TC FASCINATED WITH SSTV

Tom Christian, VR6TC, received his Robot SSTV gear on April 12, 1979, and there has been quite a bit of excitement in the 21,340 to 21,350 kHz range since soon after that time. Tom experienced some generator problems, followed by some hook-up problems with the Robot system which delayed his on-the-air SSTV activities until the first week of June. Ralph Cabanillas, Jr., W6IL, Tom's "right hand man in the U.S." was on 14,230kHz with Tom when the first VR6TC/SSTV contacts were made. W6VIH was the first two way video contact with Tom, followed by WB6ZYE. The next day, Tom switched back to his favorite frequency, 21,350 kHz and worked W6VIO at the Jet Propulsion Labs. A unique coincidence happened during that QSO. A chap whose mother was born on Pitcairn ,and had written a book about Pitcairn, was visiting W6VIO. He held the book in front of the camera, and Tom was able to see its cover and read the title via SSTV. This was their first view of the book.

Tom is still getting experience working with SSTV, so we will all need to be extremely understanding and patient with him during on-the-air activities. Although Tom has visited the United States and New Zealand, he's never (previous to SSTV) tuned in a television. At first he thought the set was out of focus, but amateurs talked him through the brightness and contrast adjustments and things began working properly.

When I talked with Tom on June 19, he was in top spirits and very excited with SSTV. Tom had been monitoring the SSTV activity on 14,230kHz during the evenings on Pitcairn (0600-0800 GMT, typical), and he said pictures were coming through relatively well. Judging by Tom's comments I'm able to partially visualize his amateur activities. He fires up his cranky, old generator on Tuesday mornings (Pitcairn time) around 2230 GMT (barring generator problems) for his weekly QSO with W6IL and the others on frequency. This activity centers around 21,350 kHz. After Tom conducts necessary business with W6IL and others, he's then open for QSO's. A similar routine is also followed on 21,350 kHz at 1630 GMT each Friday morning. The usual Friday contact is K6DTT-the Voice of Prophecy station. When Tom operates or listens on 20 meters during his evening hours, his NorthSouth openings (Japan-New Zealand) seem better than Western (U.S.) openings. Thus, working Tom on 15 may be easier than 20 until propagations shift. No one can foretell this happening, but don't be surprised if Tom appears on 14,230 kHz when you're operating SSTV during the wee hours after midnight sometime.

Thanks again to everyone for the outstanding support and assistance that has resulted in the VR6TC/SSTV operations.

SSTV CAMERA ABOARD UPCOMING OSCAR

A couple of years ago, I suggested to AMSAT an idea for including an SSTV camera aboard some future OSCAR satellite. I wasn't sure anyone would even consider the idea sane. Now it's actually happening. The VOSAT group at the University of Surrey in England is working toward a future Phase III satellite which will include a small SSTV camera for cloud cover and ground pictures from the satellite proper. It's still too early for drawing conclusions, but I've proposed the SSTV system output with FM in the 145 mHz range of 2 meters, that a 3 minute timer be employed to restrict battery loading and that telemetry information be keyed into the picture's top few lines. I also proposed camera functions be ground-controlled using coded sequences and touchtone© signals.

That should overload my mailbox with an insurmountable number of arguments, and modifications, so go ahead and write - telling me your thoughts. I'm anxious to hear your suggestions, and soon. Visualize the possibilities of this SSTV-in-space camera when it eventually happens. Our own weather satellite, which (hopefully) can be received with practically any 2 meter FM rig and an SSTV monitor. Talk about possibilities! We'll keep you posted on the evolution of this project. Here's hoping all continues well.

DISC TV COMEBACK

The British Narrow Band TV Club has been pursuing various inexpensive means for permitting amateurs to receive Slow Scan TV. One of their more interesting concepts uses a modified form of the early Nipkow scanning disc and some form of light source which I haven't yet understood. The only description I've seen was very brief, however. This group will definitely warrant hearty congratulations should their project succeed. Old timers will, undoubtedly, remember 1925 scanning disc tv systems which could be home constructed from scrap parts such as a DC motor, rheostat (for controlling scanning wheel speed/sync) and a paper or metal disc with a spiral of holes for scanning. During those early days, a special "crater tube" was modulated by incoming audio tones and placed behind the disc. As each hole in the whirling disc moved across the crater tube's glowing surface area, the transmitted pictures were reproduced. One of the most fascinating tales I've heard about this era tells how A.M. broadcast stations would sign off the air at midnight, and return to the air 30 minutes later with "pictures". That's right - these audio bandwidth tv signals were transmitted right in the middle of our A.M. broadcast band (during 1920's). Furthermore, there are reports of U.S. "tv signals" being received as far away as Australia and New Zealand. Fantastic! It's quite interesting to note the similarities of the wheel and the scanning disc, eh?

BAND CONDITIONS GOOD

As you're probably been noticing, our "good ole" amateur bands have been doing quite well recently. The daily WWV propagation forecast at 18 minutes past each hour are consistently reporting sunspot activity above 200, and the bands are bearing this true. 20 is often "open" around the clock and many times the DX signals are very strong. Ten, too is sporting its colors-often as late as 9:30 p.m. local times. As Mike Stone, WBØQCD, puts it "numerous SSTV and DX also in this QRM-free range permits closed circuit copy of stations such as KP4EDK, ZD8KG(!) KZ5RH and many more. Don't just sit and wait for action on 28,680; hearing none, call CQ!"

I couldn't have said it better, Mike.

VOYAGER II ENCOUNTERS JUPITER

The W6VIO gang at JPL did it again. They were on the air during July 6-11 with SSTV views which were even more fascinating than those acquired by Voyager I during March. Dick, K6SVP was again the main operator, and his narrations were absolutely great. I was just one of the many SSTV operators glued to my monitor watching every picture of this unbelievable operation. It was really like an actual part of Star Trek right in the shack. Congratulations to all the W6VIO gang for an outstanding operation. They truly deserve a prominent place in the SSTV hall of fame.

That "wraps up" things for this time. Thanks to everyone for the cards and letters. Watch the SSTV frequencies for more activities during the coming weeks, and let's hear more of the old SSTV gang back on 20 during week nites! 73, Dave Ingram,K4TWJ, Eastwood Village #1201 South, Rt. 11 Box 499, Birmingham, AL 35210.

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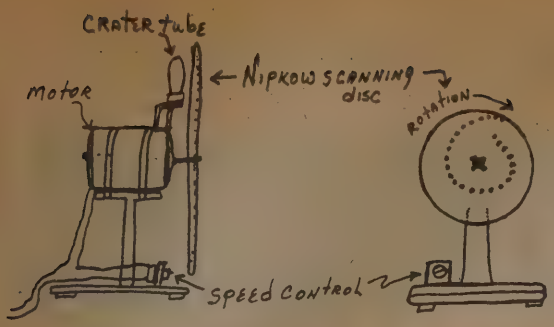
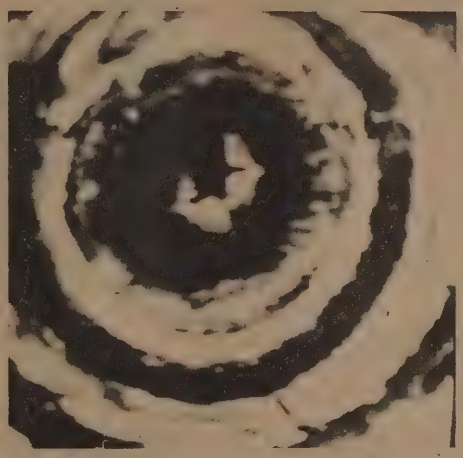


Figure 1 — Sketch of early scanning disc tv system. As the disc rotated in front of the intensity modulated crater tube, its holes would trace a raster; each hole corresponding to one line of the picture. Although high speed lamps (neons) were not available when Paul Nipkow invented the scanning disc (1800's), he was awarded a Nobel prize for his creation of pix scanning.

Here's the first ever TV picture to eminate from Piteairn Island. Tom was still having a minor problem with vertical scan rate, but his ID and facial shot are quite visable.



SSTV view of Jupiter from below its South Pole, looking "up" at the multi-colored, ringed planet. This view retransmitted by W6V10 at JPL as Voyager II passed Jupiter.

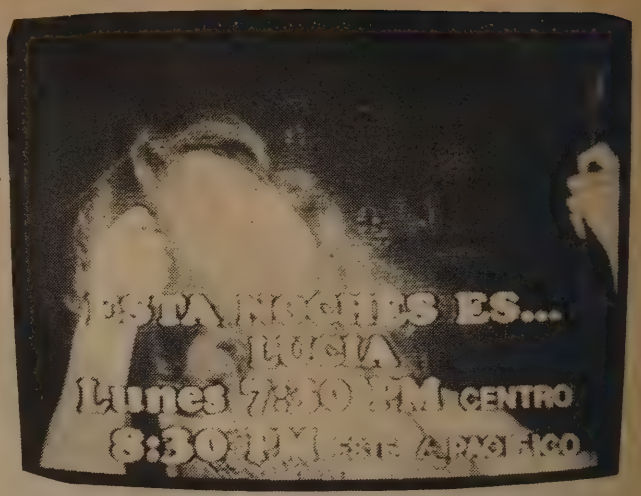
This is a view of Europa from approximately 600,000 meters distance. Dick explained practically every detail of this view during its retransmission by W6V10.

Dick Piety, K6SVP, was the main operator at W6V10 when this classic SSTV picture was transmitted during the Voyager II-Jupiter encounter. Casselio is in lower right, with Ganeymede in lower left. Europa is near center, and Io is small moon on top left. That's Jupiter on top right. The full details of this phenominal picture were not reproduced on the photographic film.

This is a view of Ganymede, one of Jupiter's moons which is heavily covered with ice formations. Again, Dick, K6SVP, was operating W6V10 and fully describing each picture.

total signals present (*).

The United States allows private firms to own and operate satellites. We are unique in this regard in the world; virtually all other satellites are owned and operated by either government agencies or consortiums of government or government and private agencies.



MEXICO CITY VIA SATELLITE—programming from the 'Spanish International Network' (SIN) is carried an average of 8-12 hours per day out of Mexico City via WESTAR II.

At the present time there are seven (7) U.S. privately owned satellites in operation. Four of these regularily carry television programming. The three that do not presently carry television (COMSTAR I,II and III) are jointly owned by AT&T and GT&E telephone and are presently utilized for telephone communication relay. However it is anticipated that these three also will within a year or less. In addition to the four U.S. satellites regularily carrying television programming, there are three Canadian operated satellites of which one also carries three channels of television. This says there are presently five satellites in orbit carrying television which is receiveable in some or all portions of the North American continent; a total of 36 (plus) channels of television reception. And the number of channels involved is growing monthly on these five satellites. Additionally, a third Western Union (WESTAR III) and a third RCA (SATCOM F3) satellite are likely to be launched during 1979.

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Satellite TV Handbook

systems. In a sense, this is television programming intended for the public; or some segment of the public. Which is another way of saying "such transmissions are not private". This is an important point we shall return to later in this phamplet.

On the other hand the broad 'occasional-scheduled programming' categorey is usually intended for one (or a small number of) specified receiving points. An example of this would be the 'tele-conferencing' between Alaskan natives and southwestern states native Americans (Indians); an annual two hour event where these respective groups utilize the satellite to discuss, live, their respective problems with the Federal government.

CAUGHT 'OFF-CAMERA'—NBC college basketball announcer Dick Enberg sips coffee during a 'break' in game coverage; network events relayed via satellite run 'live on the satellite' during commercial, other breaks. Insight into the 'real star temperments' is an exciting aspect of satellite watching.

Another example of this is the use of the satellite by the major (U.S.) television networks to show their ('terrestrial') affiliates "previews" of upcoming programs, specials and the like; interspersed with sales messages from the network headquarters to the affiliate station managers. Such satellite transmissions are strictly private and are not legally receiveable by unauthorized 'third parties'.

In between these two broad categories fall another group of transmissions. The TV networks make regular (daily) use of the satellite to transmit news items and sports items (or complete sporting events). These satellite transmissions are typically hours or even days ahead of their actual release via the national ('terrestrial') networks. Here the material is private, not intended for anyone but respective network personnel; although within a matter of hours (or days) the same material (or major portions of it) will become public material.

A prime example of this is the NBC network use of the satellite to transmit the actual live 'Johnny Carson Show' from Burbank studios to New York NBC headquarters. This is done daily at around 5-5:30 PM Pacific time. Because the actual editing and final program form is created in New York after the satellite transmission is received there the version seen on satellite is slightly different than the version you will see in your home via regular 'terrestrial' television later that same evening. Words "bleeped' are heard 'live' on the satellite transmission; commercial breaks are often filled with bustling studio activity (most commercials are added in New York). Again this is 'private material' until the network later releases it to the public.

In the last pages of this phamplet are satellite by satellite listings of what you can expect to find on the five 'primary satellites' discussed here.

RESTRICTIONS TO RECEPTION

Much of the previous section has alluded to the matter of 'privacy' of satellite television communications. What is that all about?

In 1934 when Congress created the 'Communications Act of 1934', it vested certain egulatory powers in a federal agency known as the Federal Communications Commission.

Satellite TV Handbook

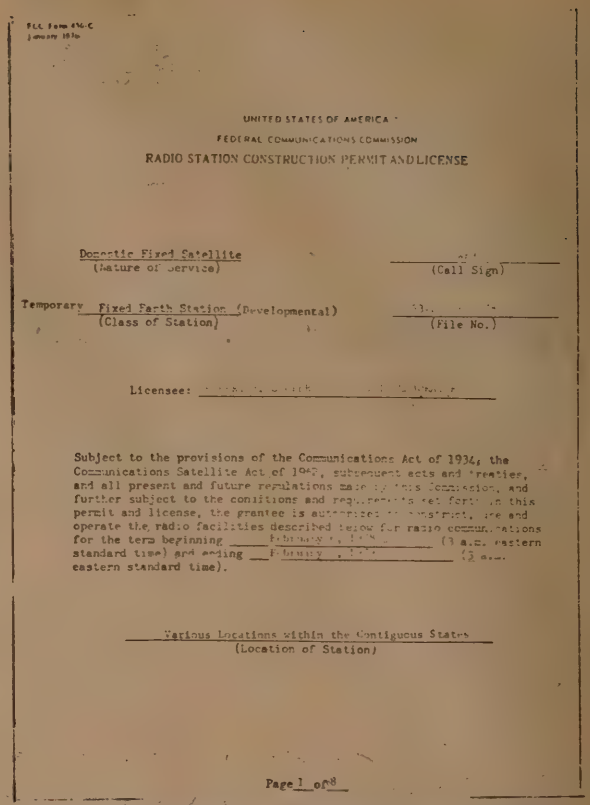
The FCC, as it is known, creates the rules, regulations and policies which govern the day to day administration of communications in the United States.

One of the rules sets forth the distinction between 'public communications' and 'private communications'. Another rule sets forth the procedure to be followed when you "intercept" or "access (yourself to)" a private communication not specifically intended for you.

Regular radio and television reception, such as you enjoy in your home, is public communication. Anyone with a receiver can 'intercept' or 'access' the transmissions with no special permission required.

Satellite (television) transmissions, on the other hand, are 'private transmissions' intended for specified recipients. There are two reasons for this:

1) Some of the transmissions are private in that they contain confidential material directed from one person/company to another specific person/company. Interception of such transmissions in effect violates the privacy of one or both the addressor and addressee parties. In a word, you are 'eavesdropping'.



FCC Form 494-C
January 1976

UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION
RADIO STATION CONSTRUCTION PERMIT AND LICENSE

Domestic Fixed Satellite (Nature of Service) — (Call Sign)

Temporary Fixed Earth Station (Developmental) (Class of Station) — (File No.)

Licensee:

Subject to the provisions of the Communications Act of 1934, the Communications Satellite Act of 1962, subsequent acts and treaties, and all present and future regulations made by this Commission, and further subject to the conditions and requirements set forth in this permit and license, the grantee is authorized to construct, use and operate the radio facilities described below for radio communications for the term beginning February [illegible], [illegible] (3 a.m. eastern standard time) and ending February [illegible], [illegible] (3 a.m. eastern standard time).

Various Locations within the Contiguous States (Location of Station)

Page 1 of 3

FCC LICENSE—granted to CATJ Editor in chief Bob Cooper authorizes construction of 'developmental' satellite receive terminal. See text.

2) All of the balance of these transmissions contain programming material to which someone (other than yourself) has a property right; as in 'copyright interest'. That simply means they have expended some amount of funds to create and or distribute that privately held works (i.e. program) and they are therefore entitled to compensation if anyone receives and utilizes that material.

To get on the 'right side of the law' in this situation requires that you, as a private individual (or as a group of individuals cooperatively participating in the installation of a receive terminal) do the following:

1) Go to the Federal Communications Commission (1919 M Street NW, Washington, D.C. 20554) and file an application for a license to construct and operate a 'private television receive-only' terminal.

2) Having obtained that FCC permission, then go to the various program-rights owners who have programs on the satellite and receive from them their permission for you to 'access' or 'intercept' (and utilize for your private use) their programs.

The FCC licensing routine for these terminals is uncomplicated. There are several forms to fill out and a cover letter to prepare to go with the application. Exact instructions are available for $5.00 per set (write: CATJ Magazine, Suite 106, 4209 NW

23rd, Oklahoma City, Ok. 73107; request 'Licensing Package' and enclose payment - to CATJ Magazine - with order). This will obtain for you (after a 45-60 day license application processing wait at the FCC) a one-year-developmental/experimental license to construct and operate a receive terminal. The license is renewable.

Once you obtain that permission, you then contact your selected channel/transponder operators to 'negotiate a use-rights contract' with them. Other than the religious programmed transponders on SATCOM F1 (Trinity Broadcasting, PTL and CBN) you should expect to pay a monthly fee (typically on an annual basis) of approximately $5.00 per month for the movie-sports services (HBO, SHOWTIME, FANFARE, HTN, etc.) and about the same amount per year for the use rights to television stations relayed through the satellite (such as Atlanta's WTCG, Chicago's WGN, San Francisco/Oakland's KTVU, etc.). A listing of these sources is included in the afore-mentioned 'Licensing Package'.

There is another way to do this (other than not doing it at all). The FCC processes regular licenses (3 year term) for cable television systems by a different process. Some individuals have followed the 'CATV process' because it insures that in the future the FCC will not license in your immediate area 'terrestrial' microwave radio transmitters which might interfere with your satellite reception. (If you elect to follow the experimental/developmental license route, there is no 'FCC protection' for your terminal.)

The cable television procedure involves going through something called 'Frequency Coordination'; a procedure where a highly skilled professional engineering company starts with your precise geographic coordinates (your longitude and latitude) and through a computer program compares your location against all FCC licensed microwave transmitters. If this study reveals that your location will produce interference-free pictures, they prepare a complicated license application form which is then sent onto the FCC as your license application. Most firms doing this type of work charge a flat fee of approximately $1,200 for both the 'frequency coordination study' and the license application preparation. Keep in mind the developmental/experimental license requires none of this; there are no tests or fees involved by that route.

Companies engaged in this type of work include:

1) COMPUCON - (attention: Bob Shannon), 13749 Neutron Road, Dallas, Texas 75240 (214-233-4380)
2) COMSEARCH, INC. - (attention: Harry Stemple), 2936 Chain Bridge Road, Oakton, Virginia 22124 (703-281-5550).

What about how you use the signals? Are there restrictions here?

Yes and no. If you have a license, and an agreement with the program supplier(s), you are entitled to use the received materials covered in your own home for your own private (not public) enjoyment. This means non-commercial use in most instances although there are some exceptions to this statement.

Could you, for example, connect one or more neighbors to your receive terminal? Technically the signal coming out of your modulator (see page 8 here) can be shared with two or 2,000 (etc.) homes in your area. This is basically what a cable television system does; it receives the signal, 'processes the signal', and then 'shares' the

SATELLITE TV

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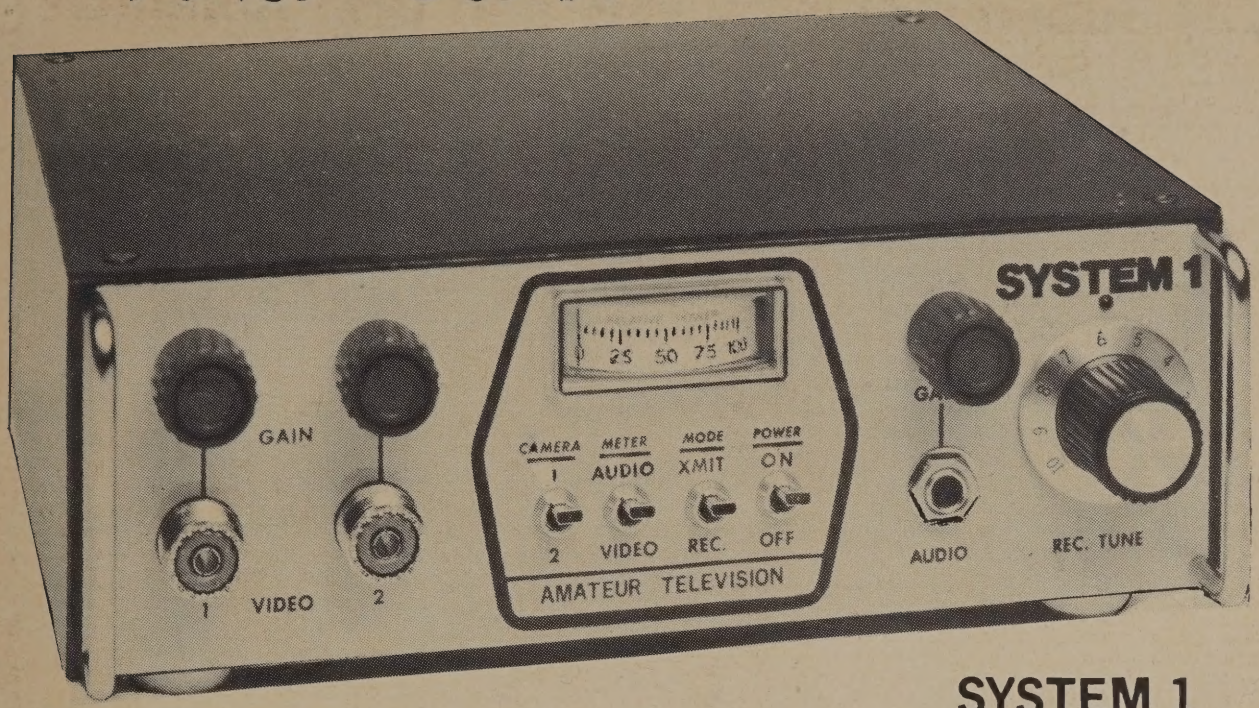

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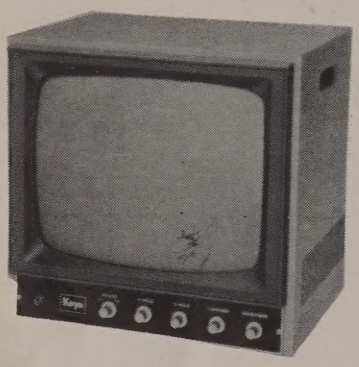

PARTIAL LISTING of CAMERAS and MONITORS:

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Hitachi HV-62S 2:1 interlace camera, 550 lines, ALC, white suppression.....$326.70

Hitachi GP-5 color camera w/6:1 zoom lens and electronic viewfinder.....$1195.00

Hitachi VM-910 9" 500 line monitor.....$216.00

Koyo TVM-90 9" 600 line monitor.....$194.00

Koyo MV-12 12" 700 line monitor.....$320.00

Sony/Image-21 custom color rcvr-monitor.....$715.00

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